ANNUAL SPRING FISHING ISSUE

UTAH DIVISION OF WILDLIFE RESOURCES • SPRING 2006

wildlife REVIEW

Wildlife Review

Utah Division of Wildlife Resources

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Utah Wildlife Review, Vol. XX, Issue 1
Wildlife Review is published quarterly by the Utah Division of Wildlife Resources.

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Subscriptions:
Send $10.00 for one year or $25.00 for three years to the above address.

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Published & printed in the USA

Photo at right: stream adjacent to the Nebo Loop Road

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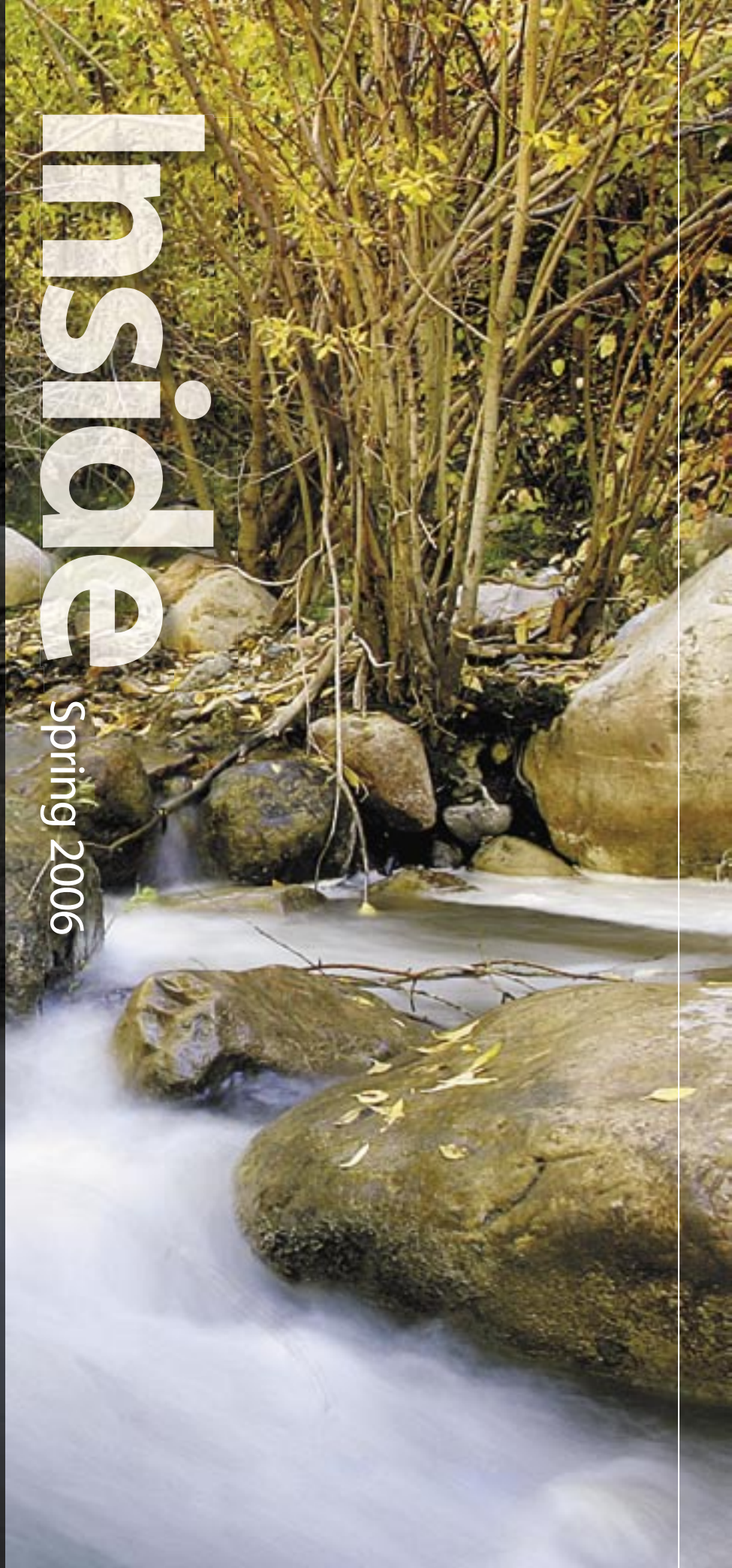
Spring 2006



DIRECTOR'S MESSAGE

"The Division of Wildlife Resources is working hard to provide plenty of opportunity for Utah's anglers. I encourage all of you to get out and enjoy this quality resource with your family and friends this spring."

THANK YOU for picking up the *Wildlife Review*. This special spring issue focuses on fishing and includes several informative and educational articles about the state's abundant and diverse angling opportunities.

There's plenty of good news for anglers this spring. Two of our hatcheries, closed due to whirling disease, have been remodeled and are now back in production. The Kamas hatchery has been completely rebuilt and is producing over twice as many fish as it did 10 years ago. That means more catchable and fingerling trout for Utah's traditional core of anglers. We hope to continue to step up stocking as our other hatcheries are remodeled and production is increased.

Special fishing regulations at Strawberry Reservoir are finally paying off, and we expect to see great fishing there this summer — lots of Bear Lake cutthroat over 22 inches and a fair number of rainbow keepers.

We are also seeing new opportunities for the growing ranks of warmwater anglers. Sand Hollow Reservoir, near St. George, shows great promise as a productive new bass and bluegill fishery. And nearby Quail Creek Reservoir continues to produce well. Great fishing is expected at Lake Powell too.

Our community fishing program has been a huge success near the major urban areas of the state. Along the Wasatch Front, waters like Willow and Bountiful ponds provide thousands of hours of angling enjoyment. The division is always on the lookout for promising waters that can be developed into fisheries for kids, seniors and others who can't travel far from home.

The Division of Wildlife Resources is working hard to provide plenty of opportunity for Utah's anglers. I encourage all of you to get out and enjoy this quality resource with your family and friends this spring.

James F. Karpowitz
UDWR Director

By Ann Evans
Former Aquatic Education Specialist

Starting out fishing

Learning to fish isn't as hard as some think.

YOU'VE PROBABLY heard fishing stories in the lunchroom or around the water cooler at work, at family gatherings or while sitting in a restaurant.

You may have thought to yourself that fishing would be a great thing to try, a way to get outdoors and enjoy the scenery, a great way to spend time with family and friends. Then you walk into a sporting goods store and become completely overwhelmed by the array of equipment and bait. You don't know the first thing about fishing or even where to begin.

Relax! Fishing is for everyone, and there's plenty of help available to get you started.

Free equipment

One of the barriers that often keeps people from fishing is equipment. It shouldn't. All you need to get started is a fishing rod and reel and a hook, a bobber, a sinker and some bait.

And you don't even have to pay for this equipment. UDWR rod-and-reel checkout sites are located throughout Utah where you can check out a rod and reel, and a small box of basic tackle, for free. You can use the equipment for two weeks and then return it, just like you would a library book. This is an excellent way to try out equipment and get a feel for what you like.

A list of checkout sites is available on the Web at *wildlife.utah.gov/ae/rodandreel.html*. If you don't have Internet access, you can receive a printed brochure through the mail by calling the Division of Wildlife Resource's Aquatic Education office at (801) 538-4769.

If you'd like to buy your own equipment, a basic rod and reel combo is available at most sporting goods or discount stores for as low as $10. As you learn advanced techniques and improve your skills, you can always upgrade your equipment.

Fishing waters

Another question new anglers often ask is "Where do I go?" There are several ways to find out.

A statewide fishing map is available at no cost. The map shows most of the rivers and streams in Utah and provides information about the type of fish you'll likely catch at each water. It also shows waters that provide access for those with physical challenges.

For updated fishing information, you can access a weekly fishing report at the UDWR Web site at *wildlife.utah.gov/fishing*. The report will tell you how the fishing is at waters across Utah, including the type of fish that are biting and which baits to use.

If you don't have time to travel far or you just want a short, after-work or

BRENT STETTLER

UDWR-sponsored kids' fishing events are a great introduction to the sport.

before-dinner fishing experience, a Community Fisheries booklet is available that lists all of the fishing waters within urban areas in Utah. You'll often find a community fishing water within a short drive or walk from where you live.

The map and booklet are available from any UDWR office or by calling the Aquatic Education office at (801) 538-4769.

Plenty of ways to learn

Not knowing how to fish keeps many people away from fishing. Fishing is just like any other hobby or sport: the more you learn and the more you practice, the better you'll become.

There are countless ways to learn about fishing. Books, videos and magazines that discuss rigging, techniques, lures, fish habitat and feeding behaviors are available at your local library or sporting goods stores. You also can take classes at your local recreation center or shop that sells fishing equipment. The sales people in these shops (called tackle shops) are very knowledgeable and love to talk about fishing. They're an excellent source of information. The Internet also has a wealth of information about fishing.

Just getting out to lakes and streams to observe what other anglers are doing and to learn the behavior of fish is a good way to increase your knowledge. The more you know about where fish live and what they feed on, the better angler you'll become. Become fishing buddies with a seasoned angler; experienced anglers love to share their favorite spots and techniques with friends.

Remember this

The most important thing to remember about fishing is that success is measured by the fun you have, not by the number of fish you catch. Fishing is a great way to spend time with family and friends and to get outdoors and away from the stress and tension of everyday life. Give it a try. You'll find a great new hobby and something that will bring enjoyment and peace to your life.

BRENT STETTLER

Chris Colt passes along some of his fishing expertise to his daughter Sarah.

By Dale Hepworth
Retired Aquatics Manager, Southern Region

Bass anglers: there's a new reservoir calling your name.

Sand Hollow

IF YOU'VE BEEN thinking about taking up bass fishing but haven't gotten around to it yet, a new reservoir could be just what you need to get out this spring.

If you're an experienced bass angler, you've probably already heeded the call to fish Sand Hollow Reservoir, a new and red-hot bass water in southern Utah's Washington County.

Utah's newest bass water

To reach Sand Hollow Reservoir, turn east off of I-15 on SR-9 and travel toward the city of Hurricane. Halfway between the interstate and downtown Hurricane, watch for the recreation sign and make a right turn to the reservoir and the state park. Sand Hollow Reservoir is only a 4 1/2-hour drive from Salt Lake City. That's pretty darn alluring when spring fever sets in and you're thinking of shirtsleeve days in Utah's Dixie.

Sand Hollow Reservoir is about 600 acres in size. Its blue water and sandy beaches contrast beautifully with the red rock country the reservoir sits in. A $5-per-vehicle state park fee is charged to enter the area. Park facilities include a large, paved boat ramp; a parking area for both vehicles and trailers; a campground; restrooms; and picnic tables.

Bass fishing at Sand Hollow reservoir is as good as it gets. New bass reservoirs typically start off with several boom fishing years when bass populations explode, and the bass population in Sand Hollow has done just that.

Water was first diverted into the new reservoir in 2002, and largemouth bass and bluegill were stocked shortly thereafter. The reservoir was closed to fishing in 2003 to give the fish a chance to grow and reproduce.

Fishing started off with a bang in 2004 and got even better in 2005. Plan for a variety of bass sizes in 2006, with lots of six- to 10-inchers and a surprising number over five pounds. And don't forget the bluegill either. They're fun for the kids to catch, and they're great to eat.

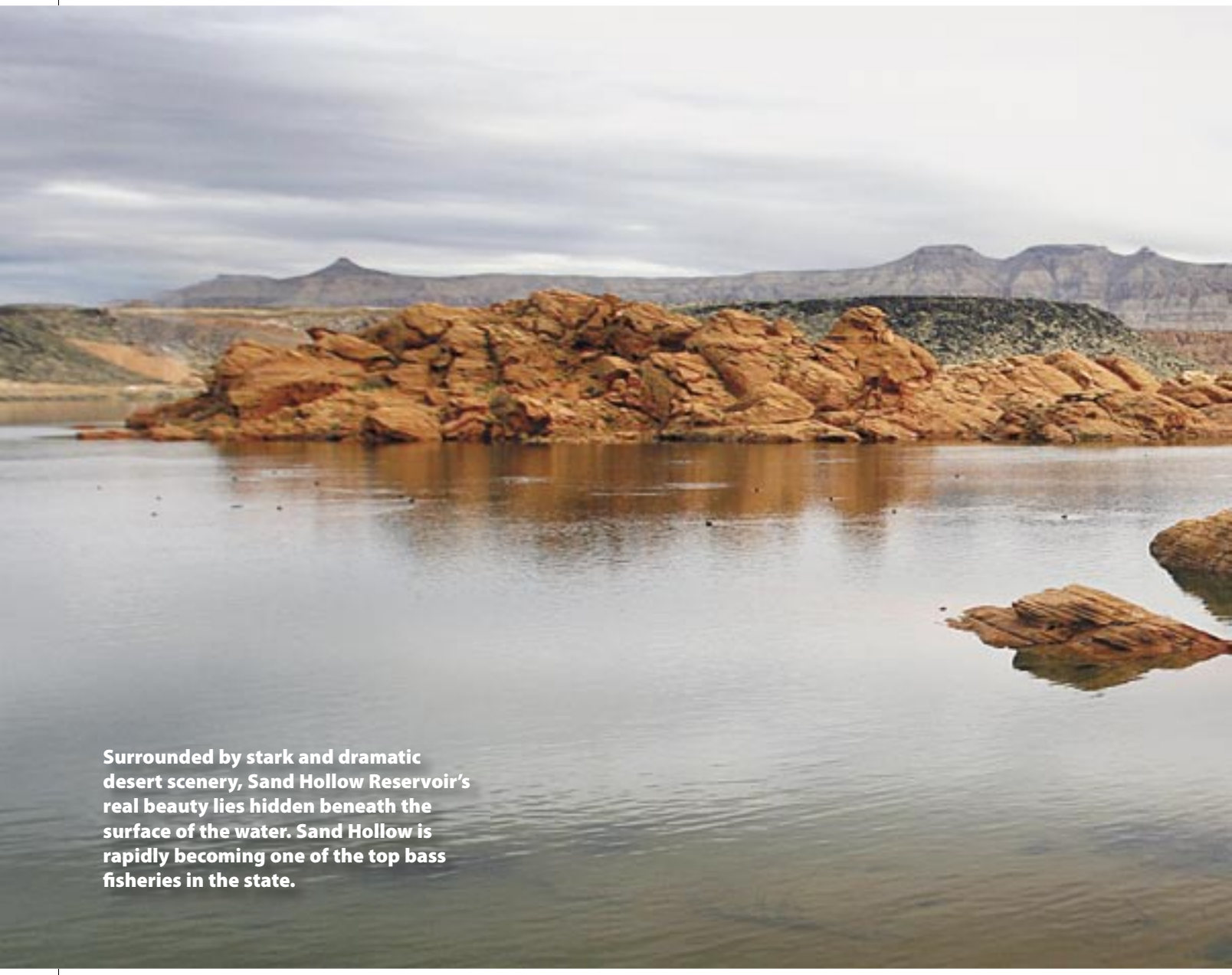
Fishing regulations require that all bass between 10 and 20 inches long be released. Most of the bass in the reservoir are protected because it's been hard to sustain good largemouth bass fisheries in Utah. Restrictive rules such as these have worked well for many years at nearby Quail Creek Reservoir. The liberal statewide limit of 50 bluegill still allows you to keep plenty of fish to eat.

Tips and techniques

Worms are a good bet if you'd like

LYNN CHAMBERLAIN

The upcoming season will bring plenty of traffic to this Sand Hollow boat ramp.



Surrounded by stark and dramatic desert scenery, Sand Hollow Reservoir's real beauty lies hidden beneath the surface of the water. Sand Hollow is rapidly becoming one of the top bass fisheries in the state.

to see your kids catch fish. For bluegill (and more bass than you might think) try fishing a worm below a bobber. Kids like the excitement of watching the bobber twitch a few times and then disappear completely under the water.

As your kids' fishing skills improve, try threading a whole nightcrawler on a hook, leaving the tail to dangle free. Then cast the nightcrawler out and slowly retrieve it around rocks and brush, which are places a good-sized bass might lurk. You might need to add some weight to the line to cast it where you want it to go.

When you learn where the bass are most often located and how they bite, and you and your kids have gained some confidence, try switching to plastic worms, tube jigs or curly tails. Plugs, spoons and spinners can also be effective. Small jigs also work for bluegill.

If you're fishing with worms, it's a good idea to remember a hook remover so you can release the bass you catch without seriously injuring them. Fishing from a boat is the easiest way to get around the lake, but if you're willing to walk a little, you'll find lots of shoreline and plenty of fish.

A good thing to remember when you're fishing is to be flexible. A simple change in where you're fishing and the techniques you're using can often mean the difference between catching fish and getting skunked. Consider fishing different areas, such as steep, rocky shorelines; shallow brush-covered flats; or dikes that have rip-rap (rocks) on the face of the dike. Try different times of day, different baits and fishing at different depths. Even if you're catching fish, changing some of these approaches might result in a bigger fish on the end of your line.

LYNN CHAMBERLAIN

The time of year also is an important consideration. Even though Sand Hollow is a low-elevation reservoir in a warm climate, it doesn't warm up as fast as you might think. Inflows from cold, high-elevation streams keep the water relatively cool from February through April. The bass typically spawn in May and June, and this can be a great time to fish. Fishing before the spawn can also be great, but if the water temperature is much below 60 degrees F, fishing can be difficult. If you're fishing in the early spring, you may want to fish your lures and bait at deeper depths.

> "BASS FISHING AT SAND HOLLOW RESERVOIR IS AS GOOD AS IT GETS."

If you happen to visit Sand Hollow during a cold spell, consider trying Quail Creek Reservoir, which is only 10 miles to the north. Besides bass, Quail Creek has a good population of stocked rainbow trout, which bite better during cooler weather. Surprisingly large trout are taken from Quail Creek Reservoir every year.

Fishing at Sand Hollow isn't difficult. If you spend any time at all, you should catch fish. When you start to get that spring-fever itch, a quick call to the UDWR or Utah State Parks and

Recreation can let you know if the bite at Sand Hollow has started.

Plenty of places to visit

Gunlock Reservoir, Baker Reservoir, and the Sand Cove reservoirs—all located in western Washington County—are other good fishing options for early spring anglers. Gunlock contains largemouth bass, bluegill and black crappie. The Sand Coves contain largemouth bass, bluegill, green sunfish and stocked rainbow trout. Baker Reservoir is stocked with rainbow trout and has some wild brown trout that reach trophy size.

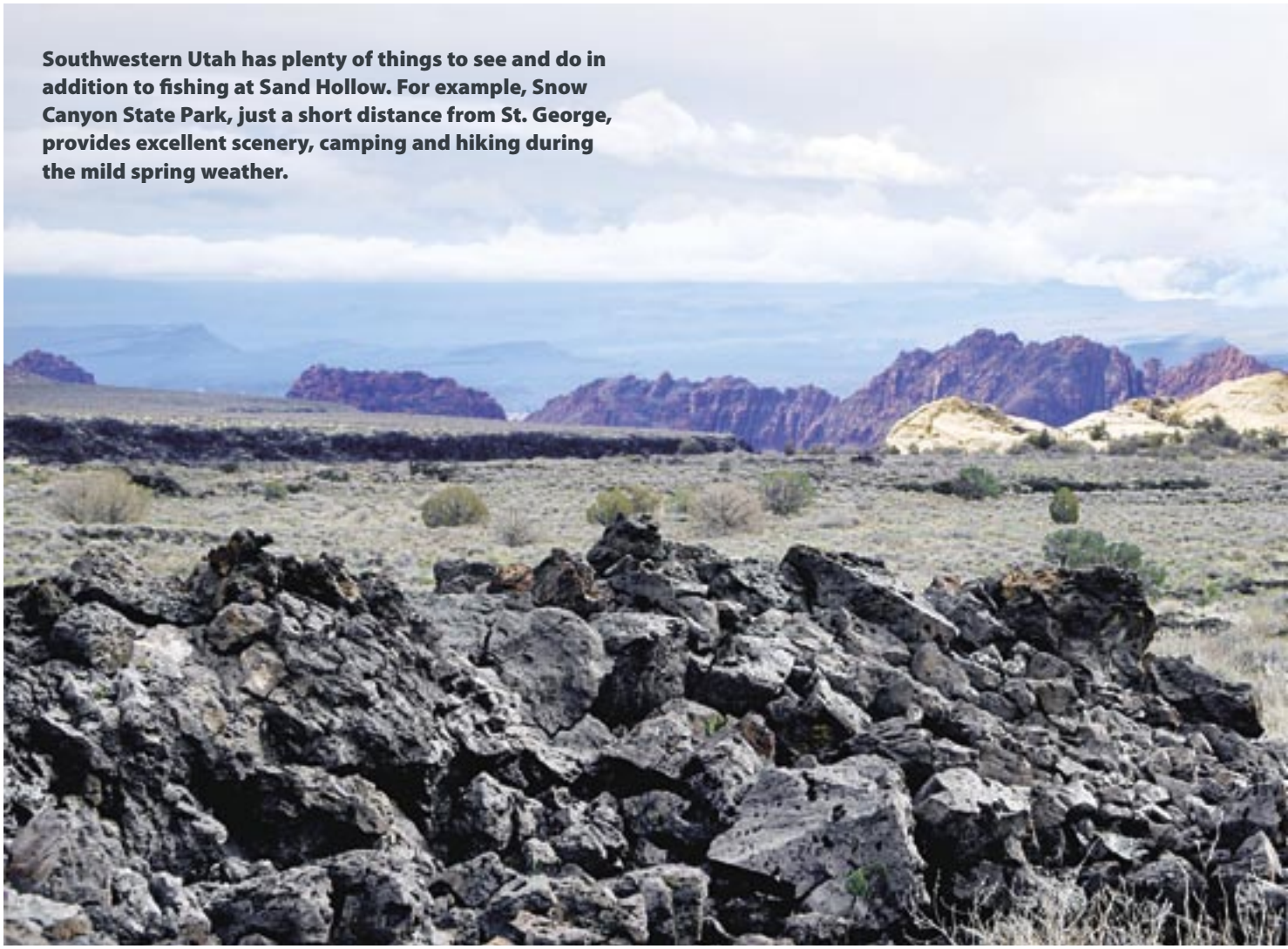
But there's more to this sunny corner of Utah than just fishing. Spring in the southwest desert brings wildflowers and wildlife that northern Utahns have to wait months to see, and many of the sights are unique to this area.

Snow Canyon State Park is among those sights. Located about 20 miles west of Sand Hollow, the park is home to a strikingly colorful canyon of red Navajo sandstone capped by black lava rock. Two volcanic cones near the head of the canyon make this park especially popular with photographers and sightseers.

Just upstream from Quail Creek Reservoir, the Bureau of Land Management maintains the Red Cliffs Recreation Site. While the dramatic cliffs surrounding the campground can make the area very warm in the summer months, the campground is especially comfortable—and popular—in the spring. During spring's cool nights, the cliffs protect the area from winds, making this an ideal spot to begin the camping season.

Zion National Park is probably the area's most well known outdoor attraction, and for good reason. The park's nearly 230 square miles of cliffs and canyons are among the most spectacular in the country. But the park is home to more than just incredible scenery; the variety of habitats found in the park also makes it a great place to view a diversity of wildlife. Deer, elk and wild turkeys are commonly seen by visitors, but more elusive animals like black bear and cougar also make their homes in the park. Zion National Park is also home to nearly 20 different species of bats and nearly 300 species of birds.

Get ready. Spring in Utah's Dixie is not far away, either in time or in miles!



Southwestern Utah has plenty of things to see and do in addition to fishing at Sand Hollow. For example, Snow Canyon State Park, just a short distance from St. George, provides excellent scenery, camping and hiking during the mild spring weather.

More to do at Sand Hollow

By Lynn Chamberlain,
Southern Region Conservation Outreach Manager

When your arm gets tired from reeling in all those largemouth bass in Sand Hollow Reservoir, you can always take a break from fishing and trade your rod and reel in for an all-terrain vehicle or swimming trunks. Sand Mountain and the Hurricane Sand Dunes are located on the south side of the reservoir. The areas provide a broad, sandy swimming beach and some of the finest sand dune riding in Utah.

With water temperatures approaching 80 degrees in the summer, swimming at Sand Hollow is just about perfect. The sandy beach is all a swimmer could ask for. It's similar to the best beaches on the Pacific Coast, but it has a better view and there are no pesky waves to get in your way! Bring plenty of sun block and a big beach towel so you can spend time soaking up the warm, southern Utah sun.

South of the beach are the Hurricane Sand Dunes. These far-reaching dunes are brightly colored in the rich orange-pink hue that is so characteristic of southern Utah. You can unload your ATV just off the road on the south side of the lake and ride for hours without ever crossing your path. Be sure to ride to the top of Sand Mountain to the south for a beautiful view of Warner Valley and the Arizona Strip.

If you enjoy the outdoors, Sand Hollow has it all: superb fishing, a soothing dip in the water, relaxation on the beach, the ATV experience of a lifetime, all in one of the most beautiful state parks Utah has to offer.

CORY MAYLETT

Recipes

UDWR staff share favorite fish recipes.

FROM A labor of love that takes months to prepare (or, to be more precise, to pickle) to a shore-side fish fry you can prepare in minutes, there are a variety of ways to enjoy the fish you catch. Our readers have let us know they want more recipes, so UDWR staff answered the call with some of their favorite dishes. Enjoy!

Smoked kokanee

Tom Aldrich
Migratory Game Bird Coordinator

Fillet kokanee leaving the skin on. All sizes of kokanee can be smoked, but I prefer fish that are one pound and bigger as they retain more moisture and allow you to smoke them longer, imparting a bold, smoky flavor.

Brine: Mix up enough brine so that the kokanee fillets float freely in the brine and don't bind together, usually at least a gallon for three large fish or six small fish. Add enough non-iodized salt to the brine water to float an egg (shell on, and uncooked), keeping track of how much salt you add. Then add double that amount of dark brown sugar. (A half-gallon of brine usually requires about one cup of salt and two cups of brown sugar.)

Refrigerate the fish in the brine for 24 to 36 hours, stirring occasionally to keep fillets from sticking together. Use a plastic bowl or large zip-lock bag for the brining process. Take the fillets out of the brine and pat dry with a paper towel. Place the fillets on a rack in front of a small electric fan until a glossy surface forms on the flesh (about an hour).

Smoking: Coat the smoker racks with cooking spray, and place the fillets skin side down so that there is at least one inch between them. Place the racks in the smoker (I prefer the electric types) and smoke continuously with alder wood chips until the color of the fillet changes to a deep reddish brown. For larger fillets, and depending on temperature, this can take six to eight hours, and can require an entire bag of chips. Remove racks from the smoker and let the fillets cool before lifting them off the rack.

Enjoy the smoked fish with your favorite fruit and cheese, and try some horseradish on the fish if you enjoy spicier foods. A glass of good sour mash goes well with smoked fish as well.

The fillets will last a week in the refrigerator in a zip-lock bag and will keep a year or more in the freezer if you vacuum pack and freeze them ... but I doubt you will have any left to freeze.

Smoked kokanee

Roger Schneidervin
Flaming Gorge Project Leader

This recipe is modified from an original recipe by Mary Lubinski of North Pole, Alaska.

For the brine, mix and dissolve the following ingredients:

- 2 cups hot water
- 2/3 cup brown sugar
- 2 Tbsp salt
- 1/2 tsp garlic powder
- 1/2 tsp pepper
- 1/4 tsp chili powder
- 1/2 cup soy sauce
- 3 Tbsp honey (optional)

Place fillets in the brine skin side up and refrigerate four hours to overnight. I typically use a rectangular glass casserole dish. Place fillets skin side down on the smoker racks and let dry one to two hours until glazed on top.

Smoke using orchard wood such as apple or cherry. My smoker has an electric element, and kokanee cook in two and a half to four hours depending on the size. I prefer smoky flavor and replace the chips every half hour.

Pickled lake trout

Roger Schneidervin
Flaming Gorge Project Leader

This recipe was given to Roger by Bearclaw Johnson of Sitka, Alaska. It works well for all sizes of lake trout, including large fish—even those over 15 pounds—that can be challenging for many cooks.

Layer fillets in bucket, skin side up and cover completely with pickling salt. If necessary, weight fillets down after salt begins to liquefy to keep them completely submerged. Keep bucket in cool place for at least a month, and up to several years (the beauty of this recipe).

Rinse off fillets, remove skin and ribs (on large fish also cut out the dark

strip of meat along the lateral line) and cut into one-inch cubes. Rinse cubes two additional times by covering completely with cold water and soaking for 10 minutes, stirring occasionally. (You can modify the process the next time based on how salty you want the finished product.)

Layer the fish in quart jars with slices of onions cut to 1/4-inch thickness.

Combine:

- 1 cup white sugar
- 1 cup water
- 2 Tbsp pickling spices

Boil for 10 minutes, stirring occasionally. Let cool, and add three cups white vinegar.

Pour liquid into jars through a strainer. Add some pickling spices for color. The recipe above should be sufficient for 10 to 12 pounds of fish.

Refrigerate at least three days before opening. The solution should be cloudy. Open in the presence of your favorite beverage and a good appetite.

Basic shore-lunch-style fish fry

Kent Sorenson
Great Salt Lake Project Biologist

This recipe works for any white-meat fish.

Start with about two pounds of fillets, bones removed. You can decide if you want to cut fillets into smaller pieces.

Ingredients:
The amounts are approximate; the proportions are what's important.

- 1 cup flour
- 1 tsp black pepper
- 1 tbsp salt of some sort (you can use garlic salt, seasoned salt, onion salt, etc.)
- 2 tsp Cavender's Greek Seasoning
- 1 tsp (or to taste) hot pepper of some kind (chipotle, cayenne, pre-mixed creole, etc.)
- 1 egg
- 1 cup milk
- Crushed corn flakes (other options are crushed saltine crackers or instant potato flakes—both are very good)

Mix flour and spices together and dust fillets (or chunks) with it; I usually use a large plastic freezer bag.

Mix egg and milk and dip fillets into it, then coat fillets with corn flakes. Again, a large bag or a large bowl with a lid works well for this.

Fry in your choice of oil (I use canola) at about 375 degrees F until corn flakes just begin to brown. Remove from oil and allow to drain on newspaper or paper grocery bags. Serve hot.

Story and photos by
By Alies Keough

Fishing with the family holds greater rewards than simply catching fish.

Family affair

Editor's Note: The Wildlife Review *staff recently realized that men had written most of our magazine's latest fishing stories. Would a woman have a different perspective? We decided to find out by asking one experienced woman angler, Alies Keough, to share her perspective on fishing. She shared this story that we think any angler can appreciate.*

I WAKE EARLY one Saturday morning to hear the little ones asking "Can we go fishing? Can we? Can we?"

Soon enough we're breathing the crisp morning air and casting lines into the cool waters of the La Sal Mountains at Hidden Lake (a mere pond in the eyes of some).

No one else is around and the water is smooth. I get all the kids set up with their fishing lines in the water and sit down by my own pole. The kids are chattering excitedly and betting on who'll catch the biggest fish of the day.

I fondly recall the first time my dad took me fishing. Dad did most of the work, but when I felt that tug on my pole and the fish fighting, I was hooked on fishing for life. I loved to hold the trout and admire their beautiful, vibrant colors. I still have vivid memories of the first fish I caught wiggling and me giggling and playing with the fish in the water until another one was on the line.

I was so proud as my brother and I brought back all the fish we caught. We lined them up on a stick so both of us could carry them and brought them to camp where mom cooked them up for supper. It took a few years for me to build up the courage to learn how to clean fish. At first it just grossed me out. Now, cleaning fish is second nature.

I can't wait to show my five-year-old, Brennon, how to reel in a fish. This is the first time he's had his own pole, and he's concentrating on the bobber intensely, longing for a fish to bite. But right now the fish are just nibbling and teasing us. The older kids are using Little Jakes Lures and are having a ball talking about past fishing experiences and watching each other's lines.

Suddenly, Whitney gets a nibble at the end of her line. She gives the pole a tug and starts reeling. Everyone starts hooting and hollering and cheering her on. But the fish gets away. The excitement mounts as everyone waits for the first fish of the day to be caught. I tell the kids I'll give a dollar to the first one who catches a fish, and that adds to the excitement.

Although I've had many exciting fishing adventures, this morning is probably the best fishing experience I can recall. Suddenly, a fish tugs on my line and I grab my pole. All the kids are cheering, "Hooray! Mom's got one!" I reel him gently, then let him fight a bit and then reel some more. Patiently and smoothly, I bring him to shore.

Corey comes running over to take

Alies Keough is an angler, and a mom, who has fished around the world.

the fish off my line. He frees the fish and lowers it into the water. Whitney reminds him, "You have to talk to the fish to get him going in the right direction." "I know, I know!" Corey says. "Go fishy fishy, go fishy fishy," he cries as the fish swims away.

Just when Brennon becomes more interested in the ants that are scurrying around on a nearby log than his fishing pole, there is a tug on his line. "Mommy!" he screams and lunges for his pole. I jump off my own rock and stand behind Brennon. With my hands over top of his tiny, shaking hands, we slowly reel in the fish together as I explain to him what we're doing.

Meanwhile all the other kids are cheering their little brother on as he brings in his first catch. Brennon wants to take the fish off the line and Whitney grabs for the camera to get a picture. Brennon is beaming as I help him hold onto the rainbow trout for a quick picture. Then Brennon gently lowers the fish into the water and chants, along with his big sister, "Go fishy, go fishy, go fishy!"

I've fished for rainbow trout on the Provo River in Utah. I've fished for chinook, pink and silver salmon in the Queen Charlotte Islands, BC in the Pacific Ocean, and down to the Sea of Cortez, catching dorado and tuna while looking for that prize-winning marlin. My love of fishing has taken me to the smooth waters of the Gulf of Mexico and off the Island of Islamorada, catching tarpons and jacks.

I've wrestled all kinds of fish in all kinds of settings, but nothing has given me a sense of belonging and peaceful calm as fishing in the cool mountain waters of the La Sals with my own kids on that beautiful Saturday morning.

Corey and Whitney Keough at Hidden Lake in the La Sal Mountains.

The La Sal Mountains are a favorite desination of the Keough family. Here, Brennon and Corey pose for a quick photo.

Thanks to anglers who have obeyed slot limits on Strawberry Reservoir over the past several years, 2006 promises to bring excellent trout fishing.

By Roger Wilson & Alan Ward
DWR Strawberry Project Biologists

Big payoff

Anglers should reap the rewards of regulations at Strawberry Reservoir.

IF YOU LIKE catching big cutthroat trout, plan a trip to Strawberry Reservoir in 2006.

Anglers have done a great job of complying with regulations that have been in place at the reservoir since 2003. 2006 should be the payoff year for that compliance and for the management direction the UDWR has taken at the reservoir in recent years.

A new management plan

Managers at Strawberry implemented new fishing regulations in 2003 to improve the quality of Utah's most important coldwater fishery and to maintain that quality for years to come. The regulations were designed to improve the age structure of the cutthroat population, increase the number and size of cutthroats and put increased pressure on expanding populations of Utah chub.

The regulations employ a slot limit that requires the immediate release of all cutthroats from 15 to 22 inches long. There is still a four-fish total possession limit, but only three may be cutthroat trout (two cutthroats under 15 inches and one cutthroat over 22 inches).

These regulations have been in place for three years, and UDWR biologists are seeing a positive response in the reservoir's fish population.

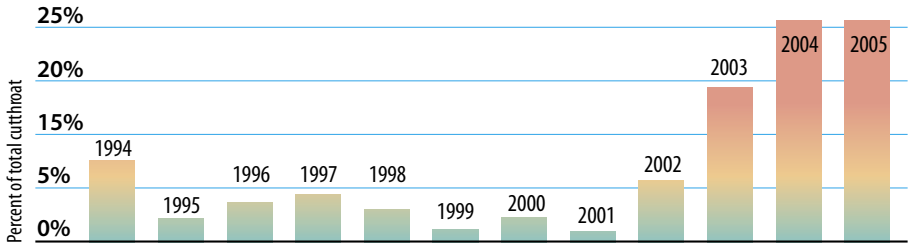
Population models based on fall gillnetting indicate that the overall number of cutthroat trout has increased steadily since 2002, and that adult cutthroat trout are more numerous than they've been since 1996. The average annual number of adult cutthroat in the reservoir has increased from 276,000 before the regulation was put in place to 518,000 since it was imposed. That's an 88 percent increase.

Not only are there more cutthroats in the reservoir, but the size of the fish has increased too. The average length of cutthroat trout increased from 15.6 inches during the fall of 2002 to about 17.5 inches during the fall of 2005. That's the highest proportion of cutthroat trout over 20 inches long in Strawberry since 1968 (see graphic on next page). In fact, more than 20 percent of the cutthroat taken in fall gillnet efforts during 2004 and 2005 were over 20 inches in length. During the fall of 2001, before the new regulations were put in place, less than one percent of the sampled cutthroat trout were more than 20 inches long.

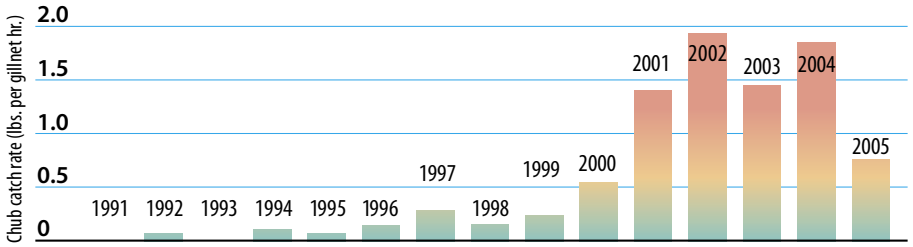
In conjunction with the increases in cutthroat size and numbers that we've observed, the overall incidence of cutthroat preying on nongame fish also has increased. This has led to a significant decline in the relative abundance of Utah chubs between the fall of 2002 and the fall of 2005. Overall chub abun-

SCOTT ROOT

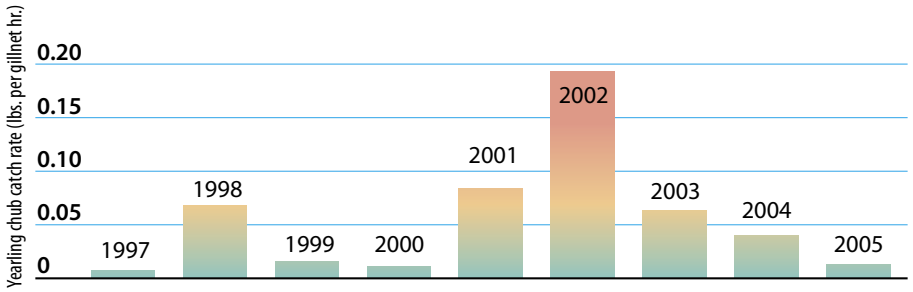
The number and size of cutthroat trout at Strawberry are on the rise.



Proportion of cutthroat trout over 20 inches in the fall gillnet sample, 1994 to 2005



Adjusted catch rates for Utah chub during fall gillnetting, 1991 to 2005



Adjusted catch rates for one-year-old Utah chub during fall gillnetting, 1991 to 2007

dance declined by more than 60 percent between 2004 and 2005 alone.

Younger age classes of chubs are in the size range the large cutthroat predators prefer, and that's the age group where the greatest reduction in chubs has happened. The relative abundance of yearling and two-year-old-chubs decreased by 75 percent between 2004 and 2005. In fact, these smaller fish have been reduced to a level where they're not readily available to predators, and many of the larger cutthroat have shifted to other foods. Fall gillnet surveys indicate that the present number of yearling chubs is about the same as we observed during 1999, which was prior to the major chub expansion of 2001 and 2002.

What does all this mean to anglers? First and foremost, it suggests that the regulations started in 2003 are working. The fishery has responded quickly and dramatically to the regulation changes.

It also suggests that Bear Lake cutthroat trout can help suppress the expansion of the reservoir's chub population, provided fishing regulations are in place that protect the cutthroats adequately.

Controlling chub

Chub overabundance has been a major problem at Strawberry in the past, and this introduced nongame fish has taken over the fishery on at least two prior occasions. Chemical treatment projects were undertaken in 1961 and 1990 to remove Utah chub and other nongame species.

The problem with Utah chubs is that they compete directly with juvenile game fish. If they're allowed to reach a critical density, they can cause the collapse of a sport fishery, particularly one focused on rainbow trout. Had the management direction at the reservoir not been changed in the late 1980s, and cutthroat trout protected with the recent, special regulations, it's likely that chubs would have taken over the reservoir by now. Evidence that the reservoir's chub population is declining is great news and suggests that the excellent fishing anglers are enjoying at Strawberry now should continue for years to come.

2006: the payoff year

During the summer of 2006, anglers can expect very good fishing for large cutthroat trout. We anticipate an abundance of four- and five-year-old fish. The four-year-old fish will be in the 18- to 20-inch range, and the five-year-old fish will be 21 to 23 inches long. A sizable component of larger cutthroat trout should be available in both 2006 and 2007.

Population models indicate that the reservoir will contain about 100,000 fish, 20 inches or greater in length, during both of these years. That's many more large fish than we've seen in the past. Before the new regulations, only about 6,000 fish over 20 inches long were typically available in any given year.

Continuing challenges

Although great fishing awaits, anglers should expect to see fluctuations in the fishery. These fluctuations will be driven by predator-prey interactions and the survival of stocked fish.

Although the four- and five-year-old age classes of cutthroat look good for 2006, the three-year-old class will be in limited abundance. Predators preyed heavily on these fish in 2004, and we don't expect this group to contribute significantly to the fishery as they move into adulthood. For this reason, anglers will not see many cutthroat trout in the 15- to 17-inch range in 2006.

In addition, we have verified problems with rainbow trout survival over the past few years. Rainbow fishing is expected to be only fair in 2006. However, the UDWR has taken steps to increase the size of rainbows stocked into Strawberry and that should improve rainbow fishing down the road.

Although we have seen some favorable reductions in chub populations, chubs will never be eliminated com-

pletely from the reservoir. We can expect to see continued chub fluctuations in response to predator numbers and other environmental factors.

Aquatic habitats and the fish populations they support are dynamic systems, and we simply cannot expect to see complete consistency in the fishery from year to year. Anglers will continue to see concentrations of chubs in the bays and under the docks during the early summer months as the chubs gather to spawn. Many of these chubs were produced before the new regulations, and they will be with us for many years to come. Our spring gillnet surveys continue to show localized abundances of chubs, even with the declining trend we've verified during our gillnet surveys in the fall.

New techniques for new times

Changing forage conditions at Strawberry will require that anglers adapt their fishing techniques to match the feeding behaviors of the cutthroats, which are predatory fish. Successful Strawberry anglers have learned to move frequently and to change techniques based on current conditions. Some of the old, standard techniques are not as effective as they once were.

Lower numbers of smaller chubs will force the cutthroat to feed on alternative items such as zooplankton, crayfish and other invertebrates. We may also see some slight changes in the growth and condition of the fish based on the cutthroats preying on these items. Strawberry, however, is still one of the most productive sport fisheries in the western United States, and we can expect that the growth and condition of sport fish in the reservoir will remain good. Cutthroats will find plenty of forage, even if the chubs continue to decline.

Keep it up

The immediate future at Strawberry looks bright. We can expect very good fishing through the next several years, and perhaps for many more to come. Angler compliance with the new regulations has been as high as 96 percent, and anglers deserve a great deal of credit for the success of the new regulations. Our data also suggests that anglers have continued to improve their skills in fish identification and catch-and-release techniques, both of which are required to comply with the rules. Keep up the great work!

Please remember that the law requires the release of all cutthroat trout in the 15- to 22-inch slot range, regardless of their condition. If your fishing techniques are killing fish, change to something else.

A good source for species identification and catch-and-release tips is a UDWR brochure titled, *Strawberry Reservoir: Fishing Regulations and Fish Identification*. The brochure is available at UDWR offices and the U.S. Forest Service Strawberry Visitor Center.

PHIL DOUGLASS

Strawberry's most successful anglers change techniques frequently as conditions on the reservoir change.

By Donna Kemp Spangler
Public Information Officer,
Department of Environmental Quality

How concerned should anglers be?

Mercury

With reports of elevated mercury levels discovered in Utah game fish, anglers who like to "hook 'em and cook 'em" might be thinking twice before frying up their favorite bass recipe or blackened catfish.

But officials with the Utah Department of Environmental Quality (UDEQ) say the risks should be placed in perspective. Consider, for instance, that only three waterways in the state have tested positive for elevated mercury levels that warrant limiting consumption and that the risks of any problems from mercury are very low if consumption guidelines are followed.

So far, environmental monitors have tested 159 sites statewide, with only three locations where fish consumption advisories have been needed. With the results now available from about 45 percent of the tests, unacceptable mercury levels have been found in only about 10 percent of the fish, said John Whitehead, assistant director of the Utah Division of Water Quality and chairman of the Statewide Mercury Work Group.

> "THIS DOESN'T MEAN PEOPLE SHOULD STOP FISHING AND EATING FISH."

"This doesn't mean people should stop fishing and eating fish," said Whitehead. "The fish advisories are meant to alert the public so they can make informed choices and, where needed, simply limit the amount of fish they are eating."

Anglers should exercise caution if fishing for largemouth bass at Gunlock Reservoir in Washington County, brown trout in Mill Creek in Grand County, and channel catfish in the Green River in Desolation Canyon. Tests there have shown mercury values that exceed U.S. Environmental Protection Agency levels of concern if these fish are eaten more than a few times each month for a long period of time. UDEQ and the Utah Division of Wildlife Resources (UDWR) have issued fish consumption advisories for those waters.

Those advisories caution that women who are pregnant or may become pregnant, nursing mothers and young children should not eat more than one four-ounce serving per month of fish from Gunlock, Mill Creek or Desolation Canyon. Mercury levels are high enough in fish from Ashley Creek that no amount is considered safe.

For everyone else, consuming fish from those waters should not be a problem if the portions are small and infrequent. The advisory recommends no more than two eight-ounce servings per month of fish from Gunlock and the Green River, and no more than three eight-ounce servings per month of fish from Mill Creek.

For the avid hunter and angler, concerns have been raised about the cumulative effects of mercury in the natural food chain. In addition to fish, some species of waterfowl—northern shovelers and common goldeneyes—on the Great Salt Lake have tested positive for elevated levels of mercury.

"The problem with mercury is that it bio-accumulates," Whitehead said. "Very low concentrations of mercury get into waterways and are picked up by smaller organisms that fish and waterfowl eat. Mercury accumulates in the muscle tissues of these fish and waterfowl in much higher concentrations than the water and then is passed on to those who consume this wildlife."

Where is the mercury coming from?

Investigations are underway to determine the source of the mercury contamination. Whitehead said one common source is air pollution, both inside and outside of Utah. Air emis-

So far, after testing fish from 159 Utah waters, only three locations have warranted special mercury health advisories.

sions of mercury occur as a result of natural phenomena, like volcanoes, forest fires and geothermal activity. It also can result from man-made activities like incinerator burning, scrap metal recycling and mining processes.

"UDEQ is working with neighboring states to learn more on how releases of mercury from sources in nearby states, including the gold mines in Nevada, may be impacting the state of Utah," Whitehead said. He added that state regulators will "implement an aggressive monitoring program to determine if there are other areas in Utah where fish or waterfowl would pose a human health risk if consumed."

Utahns also should be aware that a variety of everyday products in our homes and cars need to be properly disposed of in order to avoid adding more mercury to our environment. These include mercury switches in automobiles and mercury thermometers. For more information on proper disposal or recycling, visit *www.deq.utah.gov/issues/Mercury*.

How much mercury is too much?

Jason Scholl, a toxicologist at the Utah Department of Health, explains that the amount of mercury in a fish tends to increase with the fish's age and size. Fish that consume other fish have higher levels of mercury.

Most of that mercury is methylmercury, which is rapidly absorbed into the body after consumption (about 90 to 100 percent is absorbed). The body transforms methylmercury into inorganic mercury, which can remain in the body for several months.

"The nervous system is very sensitive to all forms of mercury," Scholl said. "In poisoning incidents that occurred in other countries, some people who ate fish contaminated with large amounts of methylmercury or seed grains treated with methymercury developed permanent damage to the brain and kidneys."

Lab tests also show mercury can change blood pressure and heart rates, adversely affect developing fetuses,

CORY MAYLETT

Dr. Steven J. M. Butala analyzes fish for mercury contamination at the Utah Department of Health State Laboratory.

increase the chance of abortions and stillbirths, and affect male reproductive organs.

But officials say there is no need to be alarmed by small amounts of mercury, just be more aware of the health risks of over-consumption. Mercury is a natural part of the Earth's ecosystem, and is found in minute quantities in many different foods consumed daily. For example, there is currently a nationwide advisory concerning the consumption of shark, swordfish, King Mackerel, or tilefish. More information on the national fish advisory can be found at *www.cfsan.fda.gov/~dms/admehg3.html*.

"Even canned tuna fish we all get from the grocery contains some mercury," Whitehead said. "Our job as consumers is to be aware of the concerns and issues in all food we eat and to make intelligent choices."

Monitoring for mercury

Mercury contamination is a nationwide problem, and Utah officials take it seriously.

UDEQ began collecting fish in 2000 under a program aimed at looking at a broad variety of issues, with mercury being only one of several hundred items being studied. Due to the huge amount of data collected in this program there has been a backlog in the testing because tissue samples had to be sent to an out-of-state lab for processing. UDEQ recently purchased a $50,000 mercury analyzer for the Utah Department of Health State Laboratory to analyze the samples more rapidly and report the results to the public in a timely manner.

State officials also are reaching out to the public, which has become concerned over the reports of mercury risks. An 18-member Mercury Work Group was created with officials from federal, state and local governments, conservation groups, sportsmen, businesses and other interested stakeholders. The Work Group is developing a standardized sampling strategy for collection and analysis.

More Utah fisheries may be added to the advisory list as more test results come in. Officials are planning a broad testing strategy for Lake Powell, one of the state's premier fisheries.

"We hope to look at areas where most of the fish are taken," Whitehead said.

The latest information about fish consumption advisories is available at *www.deq.utah.gov/issues/Mercury*. For more information about the health effects of mercury, visit *www.atsdr.cdc.gov/tfacts46.html*.

The Natural Resources Defense Council also has a "mercury calculator" for fish eaters on its web page at *www.nrdc.org*.

Mercury advisories aren't meant to put a damper on fishing. But they can serve as a reminder not to over-consume certain game fish, no matter how tasty the recipe.

Most Utah fisheries, like the Upper Provo River, are not expected to show significant mercury contamination. The best way for anglers to avoid exposure to excessive levels of mercury is to keep up to date on fishing advisories issued by state officials and to avoid over-consuming game fish for which advisories have been issued.

By Jill West
Coordinator of Volunteers

The joy of fishing

Watching a child's face light up the first time he or she catches a fish and improving fisheries in Utah are just two of the ways volunteers can share the joys of fishing and make a difference.

You can experience these joys through several fishing-related volunteer opportunities available through the Division of Wildlife Resources.

Volunteers pass along their love of fishing to others.

Hatchery hosts

Only a small number of volunteers serve as hatchery hosts for the UDWR, but they're among the agency's most devoted volunteers. In 2005, Michael and Janet Sloan and Gary and Carol Carter volunteered a total of 1,150 hours as hatchery hosts at the Kamas State Fish Hatchery. They gave tours and helped with hatchery operations throughout the summer.

Prior to the Sloans and the Carters, Dennis and Annamarie Oden served as hosts at the hatchery from 2002 to 2004. The Odens created a tour guide manual and helped shape the host program that's at the Kamas hatchery today.

The duties of a hatchery host are varied and demanding. The Kamas hatchery typically receives more than 30,000 visitors every year. "The parking lot was full almost every day," Dennis Oden said of the summers he served as a hatchery host.

Hosts lead four tours a day, showing groups of up to 20 people how the hatchery works. Hosts must be knowledgeable about the biology of the fish that are raised in the hatchery, including the development of the fish from egg to adult, what the fish eat, the habitat they prefer and the diseases they might catch.

When they're not leading tours, hatchery hosts often help load fish into transplant trucks and help stock the fish in lakes and streams across Utah. They also might be responsible for cleaning and maintaining the hatchery. In many ways, hatchery hosts are the "go-to" people at the hatchery, filling in wherever they're needed.

Why do they do it? For starters, hatchery hosts get to live on site at the hatchery. They arrive in their recreational vehicles and hook up to power and other utilities for free. They also receive the satisfaction that comes from educating people about Utah's fisheries and knowing their work benefits Utah's wildlife.

Currently, the hatcheries in Kamas and Fountain Green are the only hatcheries with hosts. Plans are underway to add informational kiosks to all of the UDWR's hatcheries. As new hatchery buildings are constructed in Mantua, White Rocks and Midway, more features will be added to facilitate tours and visitors.

If you're interested in learning more about the Hatchery Host program, send an email to *DWRvolunteer@utah.gov*.

Hatchery hosts ride along with with trucks bound for Utah's lakes and streams.

Annamarie Oden explains the inner workings of the Kamas Fish Hatchery to the many visitors who stop by the facility.

Teaching Utahns to fish

Helping a child discover Utah's wildlife is one of the most rewarding volunteer opportunities you'll find. In 2005, volunteers donated more than 3,700 hours at kids' fishing events. When volunteers discover the rewards that come from helping these kids, the volunteers come back again and again.

A variety of opportunities are available to introduce young Utahns to the state's fantastic fishing. Volunteering in the following areas is rewarding, a lot of fun and a good way to find a new audience for your stories about the ones that got away.

Free Fishing Day: One day is designated every year as Free Fishing Day in Utah. You don't need a fishing license to fish in Utah that day, and special events are held across Utah to introduce Utahns to the sport.

Free Fishing Day is usually held the first Saturday in June (in 2006, it will be held on June 10) and volunteers are needed to help with events. Volunteers show kids the basics of putting a worm on a hook, casting, removing hooks from fish and identifying the fish they've caught.

Special fishing events: In addition to Free Fishing Day, the UDWR coordinates events and festivals around the state that provide fishing opportunities for kids on other days of the year. Perhaps the most popular of these is the State Fair Fish Pond, located just south of the UDWR building in the Utah State Fairpark in Salt Lake City. School classes that are visiting the state fair on the morning of a school day can arrange exclusive access to the pond, and families that are visiting in the evening can drop in for one of the open evening sessions. Kids are taught a short course on fishing ethics and techniques. Then they're provided a fishing pole and are given a chance to catch and release fish in the pond.

From first-hand experience, I can tell you that it's fun to watch a group of school kids fish together. When the quiet kid who's always picked last for any sports team catches the first fish, you can see the new respect he's earned from his classmates. The same goes for the girl who insists on hooking her own worm or masters the perfect cast after only two or three tries. The sarcastic boy who's too "cool" to try fishing eventually gets pulled in by the collective excitement of his classmates and picks up a pole. Taking a group of kids fishing pulls them out of their comfort zone and gives them new opportunities to learn, try and succeed.

In addition to the State Fair Fish Pond, the UDWR sponsors several events each year for kids with special needs. The largest of these events is held in May at Salem Pond in Utah County. Close to 800 children who deal with a variety of physical challenges every day are given the opportunity to fish, many of them for the first time. This event has attracted sponsors such as Albertson's and volunteers that include the Utah Jazz cheerleaders. Those who volunteer at this event have the chance to reach out to a fun group of Utahns and help them find the joys of fishing.

Youth fishing clubs: The UDWR's Community Fishing program provides kids with an in-depth introduction to fishing. Every summer, volunteer urban fishing leaders teach structured, ongoing clinics aimed at introducing 6- to 13-year-olds to fishing. Volunteers host youth fishing clinics once a week, for

eight weeks, at one of Utah's community fishing waters. They teach young anglers everything they need to know to get them started down the road to a lifetime of fishing.

Youth fishing clubs have been established in Logan, Brigham City, Ogden, Clinton, Clearfield, Centerville, Farmington, Bountiful, Murray, South Jordan, Orem, Spanish Fork, Salem and Payson. If you'd like to learn more about becoming an urban fishing leader, contact Drew Cushing, the UDWR's community fisheries biologist, at *AndrewCushing@utah.gov* or (801) 538-4774.

The rewards of volunteering

None of these events can happen without volunteers, and the rewards of volunteering are great. Among the things you may find yourself doing is encouraging a child who is becoming discouraged, helping put a worm on their hook and demonstrating how to remove a hook from his or her catch. Whether the event calls for catch-and-release, or the new angler gets to take their catch home for dinner, the excitement on a child's face as he or she reels in a fish makes the volunteer experience worth every minute you spend doing it.

If you're interested in volunteering at fishing events, please send an e-mail to *DWRvolunteer@utah.gov* or contact the volunteer services coordinator at your nearest UDWR regional office.

More volunteer opportunities

Every year, UDWR volunteers help with the management of Utah's fisheries. Volunteers collect angler survey data for the weekly fishing report. They work on electro-shocking crews, temporarily stunning fish in streams so biologists can evaluate fish populations. Volunteers, especially those in the Dedicated Hunter program, participate in projects to protect or rehabilitate aquatic habitat, including fencing areas to keep livestock out, removing weeds and planting native plants.

For a list of volunteer opportunities, please visit the Wildlife Conservation Projects Web pages at *wildlife.utah.gov/dh/projects.html.*

Dennis Oden told hatchery staff, "Teach me to do everything you do." He found the jobs to be satisfying, if not always glamorous.

Utah's native cutthroat trout are making a comeback.

Going native

By Diana Vos
Project WILD Coordinator

WITH A HISTORY that takes them from the Pacific coast to the mountains of Utah, and from the edge of extinction to a recovery across the Intermountain West, Utah's native cutthroat trout have a past that's as colorful as the fish are.

Utah's native cutthroats

Cutthroat trout, the only trout species native to the Intermountain West, belong to the Pacific trout and salmon family. Cutthroats range from the Rocky Mountains west to the Pacific Ocean and from Alaska south to New Mexico. Across this range are at least 14 subspecies. Three of these subspecies—the Bonneville cutthroat, Colorado River cutthroat and Yellowstone cutthroat—are native to Utah. The Lahontan cutthroat is also found in Utah, but it's not native to the state.

All cutthroat trout sport a "cut," or patch of bright orange or red, on their throat. They differ from rainbow trout (their closest relative) by having basibranchial (hyoid) teeth in their throats, between the gill arches and behind their tongue. In addition, cutthroats typically have longer heads and jaws, and larger and darker spots, than rainbows.

How did they get here?

The story of the cutthroat trout's dispersal across the West begins about five million years ago, when a group of trout-like salmon ancestors split into two groups. One group became the Pacific Coast salmon and the other became the ancestors of today's cutthroat and rainbow trout. About three million years ago, the cutthroats separated from the rainbows. The rainbows stayed on the West Coast and the cutthroats ventured inland, becoming the seed stock of the various subspecies that have developed and colonized the Intermountain West.

During their travels inland, cutthroats first found their way up the Columbia River to its confluence with the Snake River. Some went up the mainstream of the Columbia while others headed west up the Snake. Over the past 70,000 years, a series of geological and climatic events have allowed cutthroats to make their way into many Western states, including Utah.

Cutthroats made their Utah debut in the Bonneville (Great) Basin about 30,000 years ago. The Bonneville Basin was not always the dry, expansive desert it is today. During wet phases of the Pleistocene, huge lakes covered nearly 50,000 square miles of the region. The largest of these lakes was Lake Bonneville, a body of fresh water

MIKE OTTENBACHER

Colorado River cutthroat trout collected from Pine Creek, Garfield County.

the size of Lake Michigan that lapped against the flanks of the Wasatch Range.

The cutthroats that entered Lake Bonneville probably arrived via the Bear River, a tributary of the Snake River that flows north out of the Uinta Mountains. For thousands of years, the Bear River flowed into the Portneuf River in southeastern Idaho. But then a series of huge lava flows sealed off the Bear River Valley and diverted the flow of the river to the south. This diversion allowed cutthroats to travel directly to Lake Bonneville.

Southern-bound cutthroats may have taken advantage of another geologic event that also occurred at about the same time. It's thought that they traveled up Marsh Creek over Red Rock Pass in southeast Idaho during a short window of opportunity. Back then Red Rock Pass was about 300 feet higher than it is today. Most of the extra height was gravel and loose rock.

At one point, Lake Bonneville rose to a level where it spilled over the saddle of the pass, eroding the loose material away in just a few days. As the pass was breached, a wall of water 400 feet high rushed through the gap, draining into and filling the Snake River Canyon. After the initial flood, water continued to flow out of Lake Bonneville for up to 20 years, offering cutthroats a natural path into the lake. The cutthroats that entered Lake Bonneville became the Bonneville cutthroat trout subspecies we know today.

About 10,000 years ago, Lake Bonneville started to recede as the climate became warmer and drier. As the lake receded, some Bonneville cutthroats moved upstream in search of high mountain streams that were cool and clear. Others adapted to the shrinking remnant lakes of the Bonneville Basin.

Cutthroat trout also made their way to the Colorado River drainage in eastern Utah. The route they took has not been clearly determined, but they might have swum over the divide between the Hoback River and the upper Green River, or possibly over the high saddles of the Wyoming Range and the Uinta Mountains, during much cooler and wetter times in the continent's geologic past. These trout settled into the tributaries of the Green River and Colorado River on the West Slope and became the Colorado River cutthroat trout.

Utah's third native cutthroat trout, the Yellowstone cutthroat, came into the Raft River system, in Utah's extreme northeastern corner, about 8,000 years ago via the Snake River.

What caused their decline?

In 1805, Meriwether Lewis unknowingly encountered several cut-

MIKE OTTENBACHER

UDWR employees collect eggs from Bonneville cutthroat trout brood stock at Manning Meadows Reservoir.

throat trout during his exploration from St. Louis to the Pacific Ocean. Caught by one of his men, below the Great Falls of the Missouri, he described these trout as "a half a dozen very fine trout … from sixteen to twenty-three inches in length, precisely resembling our mountain or speckled trout in form and the position of the fins, but with specks of a deep black instead of the red or gould colour of those common to the U'states." This occurred just one month before Lewis gave up hope of finding the Northwest Passage he sought. Ironically, ancestors of the cutthroat trout he had eaten had already found such a passage.

Trouble for cutthroat trout began about 150 years ago as settlers poured into the West.

When settlers arrived in the Salt Lake City area, they quickly learned that the area provided excellent fishing. Howard Stansbury, an engineer who came to the Salt Lake Basin in 1849 on a surveying expedition, noted that "[Utah] lake [west of present day Provo] abounds in fine fish, principally speckled trout, of great size and exquisite flavor, which afford sustenance to numerous small bands of Utahs [*sic*]." Settlers followed the lead of the Native Americans and took advantage of Utah Lake's great abundance.

For a while, Utah Lake was an especially productive trout fishery, commonly yielding cutthroats up to 20 pounds. In 1864, a commercial fisherman set a net in the lake and took between 3,500 and 3,700 pounds in a single haul. Commercial fishermen also set nets in Bear Lake and its tributaries, taking 500 to 2,000 pounds of fish per day. As early as 1874, laws were enacted to protect Bonneville cutthroats but commercial netting in the region was not banned until 1897. By the 1920s, as with Panguitch Lake to the south, the trout populations in Utah Lake were extinct. Although few cutthroat populations were exploited as thoroughly as the Bonneville cutthroats, most native trout subspecies were over-fished in the years following the Civil War.

MIKE OTTENBACHER

Bonneville cutthroat are transferred to upper Ranch Creek in Garfield County.

And over-harvest was not the only problem native trout faced. In response to the declines in native trout populations, in the late 1800s well-meaning fish commissions throughout the West began importing eggs and fry of non-native trout species. Rainbows were imported from California, brook trout from the East and brown trout from Europe. The brook and brown trout gobbled up cutthroat eggs and fry and competed with native trout for forage, while the rainbows, close cousins of the cutthroat, interbred with the cutthroats. This interbreeding diluted pure strains of the native fish.

In addition, water diversions throughout the West were proliferating at a rapid pace. While visiting the Salt Lake Valley in 1849, Stansbury commented, "Through the city itself flows

an unfailing stream of pure, sweet water, which, by an ingenious mode of irrigation, is made to traverse each side of every street, whence it is led into every garden-spot, spreading live, verdure, and beauty over what was heretofore a barren waste." Along the Colorado River in Utah's southeast portion, irrigators were also claiming water rights, and aggressive diversions along the upper reaches of the Arkansas River in Colorado were being actively developed. In 1883, the Wyoming Fish Commission cited irrigation dams and ditches as a major reason for the decline in the state's fisheries. The building of dams that followed in the early 1900s further affected native fish.

As more and more farmers and ranchers settled the dry West, the number of livestock exploded too. No stream in the Western states escaped the effects of cattle. In the worst cases, bottomland riparian vegetation was browsed to the ground, causing serious erosion. With no root systems to support them, stream banks crumbled and gravel bottoms, where thousands of generations of trout had spawned, became covered with silt. Streams grew wider, shallower and warmer, making them less suitable to trout, which prefer streams that are cool and clean.

On their way back

In a 1960s Utah Department of Fish and Game publication, the Bonneville cutthroat was described as "probably extinct." Throughout the West, many native cutthroat trout populations were presumed extinct. Then came passage of the Endangered Species Act in 1973. With this legislation came renewed interest in determining whether any native trout were still alive in the West.

Biologists began their search by examining old records, museum samples and taxidermied fish to create a list of the physical characteristics of native trout. Because it's difficult to separate pure-strain cutthroats from hybrid trout, biologists also turned to state-of-the-art genetic DNA testing. Using the physical characteristics, biologists began checking remote streams for candidate fish. Tissue samples, or entire fish, were collected and sent to laboratories for DNA analysis.

Persistence paid off

In the summer of 1974, Don Duff, a fisheries biologist with the Bureau of Land Management, pushed his way up an overgrown Deep Creek Mountains stream. At first, he found only exotic rainbows in the stream. But as he continued up the stream, he began to see rainbows that seemed to have cutthroat features. Passing over a rocky fall several miles into the canyon, he finally found trout that appeared to be pure Bonneville cutthroats. Testing in the lab confirmed his discovery. The falls had served as a barrier to the upstream progress of the rainbow trout, preventing them from hybridizing with the pure cutthroat trout above the falls.

Duff's discovery was a dramatic moment in the field of fisheries conservation. It was the beginning of a tremendous effort by personnel in public land and wildlife agencies to halt the decline of native cutthroat trout and bring them back to relative abundance.

Soon after Duff's discovery, a few small remnant populations of Colorado River cutthroats, which also had suffered a precipitous decline, were discovered. Just recently, pure populations of Yellowstone cutthroats also were found in the Raft Rivers. These were great discoveries because they showed that all three of Utah's native trout subspecies—all believed at one time to be extinct from the state's waters—still existed within their natural ranges.

During the past decade, recovery efforts have focused on continuing to discover naturally occurring wild pure cutthroat populations, restoring native populations by removing non-native trout species and transplanting native trout into renovated areas, and developing locally native wild brood stocks where eggs can be collected and cultured in state hatcheries. Many successes have been found. For example, in 1978 only six remaining populations of Bonneville cutthroats were known to exist and they occupied less than five stream miles. By 2001, Division of Wildlife Resources biologists estimated at least 166 populations existed along 630 miles of streams. This higher number of trout led the U.S. Fish and Wildlife Service to declare that listing of the species as threatened or endangered was not warranted.

Restoration of the Colorado River cutthroat has been successful too, resulting in development of Dougherty Basin Lake on Boulder Mountain as a brood stock reservoir for the subspecies and reestablishment of populations in the Uinta Mountains and the Wasatch Plateau.

Although Utah native cutthroat trout recovery efforts have been progressing well, prospects for their continued survival are tenuous. Drought, illegal stocking of non-native species, wildfires and whirling disease are among the threats native trout continue to face.

More information: Getting WILD! Utah's WILD Notebook is produced by Utah's Project WILD program. WILD workshops, offered by the Utah Division of Wildlife Resources, provide teachers and other educators with opportunities for professional development and a wealth of wildlife education activities and materials for helping students learn about wildlife and its conservation. For a current listing of Project WILD educator workshops, visit the Project WILD Web site at *www.wildlife.utah.gov/projectwild* or send an e-mail to *DianaVos@utah.gov.*

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